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ABSTRACT

Based on earning data from the U.S. Census Bureau's 1984 Survey of Income and Employment, this study estimates annual salaries of persons in teaching and nonteaching occupations. Data was analyzed using the variables of education, work experience, sex, race, marital status, weeks worked annually, hours worked weekly, urban or nonurban residence, and college degree holder status. Bases of comparison through a range of earning alternatives included: characteristics of the existing teacher work force, characteristics of the general nonteacher work force, and characteristics of the white male college-educated work force. Findings indicated that current teacher salaries are below alternative earning opportunities in other occupations by $6,718 for persons with the same sociodemographic characteristics as present teachers. When compared with nonteaching college-educated workers with the same sociodemographic characteristics, the figure was $10,268 less. In comparison to estimated alternative earning opportunity of white male college-educated workers in nonteaching jobs, the amount was $16,563 less. (JD)

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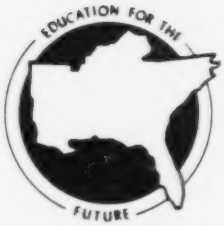
PAPER NO. 418

AN ANALYSIS OF COMPETITIVE SALARY LEVELS FOR TEACHERS IN THE PUBLIC SCHOOLS OF THE SOUTHEAST

Ronald Bird

November 1985



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EXECUTIVE SUMMARY

Recent education studies have indicated the need for higher teacher salaries to attract and retain qualified public school teachers. An analysis of earning opportunity in the Southeast for both teaching and competing occupations was undertaken to provide a basis of comparison of the adequacy of teacher salaries based on data for the 1984-85 school year. This study refines the principle of comparability and initial empirical estimates and updates the data presented in a previous report "Competing for Quality: The Comparability of Teacher Salaries to Earnings in Alternative Occupations" (Bird, 1985).

Based on earnings data from the U.S. Census Bureau's 1984 Survey of Income and Employment, the study estimates annual salaries of persons in teaching and nonteaching occupations. The data set was statistically analyzed using a multiple regression technique to enter the variables of education, work experience, sex, race, marital status, number of weeks worked annually, average hours worked weekly, urban or nonurban residence, and college degree holder status.

Observations were included only for workers who had completed four or more years of college and who worked 52 weeks at 40 hours a week to represent a cross section of the various alternatives to employment as a teacher. Three different bases of comparison were applied to the earning estimation equation to develop a range of earning alternatives. These bases for the Southeast were: characteristics of the existing teacher work force, characteristics of the general nonteacher work force, and characteristics of the white male college-educated work force. Utilization of these three bases provides policy makers with a range of comparable salary data.

The analysis indicates that current teacher salaries, despite recent increases, are below alternative earning opportunities in other occupations by $6,718 for persons with the same sociodemographic characteristics as present teachers. When compared with nonteaching college-educated workers with the same sociodemographic characteristics, the figure is $10,268 less. In comparison to estimated alternative earning opportunity of white male college-educated workers in nonteaching jobs, the amount is $16,563 less.

This report offers a range of comparison, with the above variables, to suggest beginning and maximum salaries for teachers' pay to be competitive with nonteaching earnings. Based on this analysis, competitive beginning salaries would range from $16,836 to $22,279; average salaries to attract and retain teachers would be $27,022 to $36,767; and the upper end of the teacher salary schedule would range from $34,166 to $45,210.

AN ANALYSIS OF COMPETITIVE SALARY LEVELS FOR TEACHERS IN THE PUBLIC SCHOOLS OF THE SOUTHEAST

INTRODUCTION

The role of the classroom teacher is central to the goal of achieving excellence in the public schools. Quality instruction requires that intelligent, highly motivated, and creative people be attracted to work as public school teachers, but such talented people are capable of performing many other tasks in our economy and are in demand by private industry, the professions, and government for other valuable pursuits. The job alternatives available to college graduates in other sectors of the economy provide the basis of income-earning opportunity against which the public schools must compete to attract and retain able teachers.

Almost every recent reform commission report and special study on education has pointed to the need for higher teacher salaries. In a 1984 report entitled "Staffing the Nation's Schools: A National Emergency," the Council of Chief State School Officers called attention to an emerging shortage of teachers in the nation's schools, particularly in the Sunbelt states (1984, p. 2). Inadequate pay in comparison to other career alternatives was identified as a key contributing factor to the trend. That view was supported in the findings of the Rand Corporation study "Beyond the Commission Reports: The Coming Crisis in Teaching" (Darling-Hammond, 1984). That study, and others, recognized the earning opportunities of college-educated workers in nonteaching occupations as providing the basis for comparison against which the adequacy of teacher salaries must be judged. A previous Southeastern Regional Council study "Competing for Quality: The Comparability of Teacher Salaries to Earnings

in Alternative Occupations" (Bird, 1985) applied that principle of comparability and offered initial empirical estimates of the actual comparable earnings amounts for teachers in the southeastern states. This report represents the results of refining that method and applying the technique to more recent data.

Teacher salaries are rising. In the South, every state has enacted some improvement in teacher pay in the last three years. Region-wide average teacher salaries have risen from $17,549 in 1982-83 to $20,204 in 1984-85 (SEIS Data Profiles, publication in process). That amount represents an increase at an average rate of 7.5 percent annually during the past two years. The average teacher salary levels for the past three years in each southeastern state are shown in Table 1. It is clear from that data that each state has made progress, but it must be noted that while teacher salaries have been rising, the earning opportunities in other occupations have been rising also. Based on data compiled for this report from Census Bureau samples, the average earning opportunities of all college-educated workers in nonteaching jobs in the region have risen at an annual rate of 5.6 percent during the same period. Therefore, the relative improvement in the position of teachers has not been as great as the absolute increases imply. Nevertheless, some progress has been made.

Accurate estimates of the appropriate standard against which the adequacy of teacher salaries should be measured is needed in order to project how far improvement must be pursued in order to make teaching fully competitive with other occupations. This report is a refinement and updating of estimates developed in an earlier study (Bird, 1985). That study, based on 1983 data, recommended that average teacher salaries be in the range of $17,793 to $23,889 in order to be comparable to alternative

TABLE 1

AVERAGE TEACHER SALARIES
1982-1984

	1982-83	1983-84	1984-85
U. S. Composite	20,715	21,935	23,546
Southeast	17,549	18,429	20,204
Alabama	17,850	17,682	20,209
Arkansas	15,029	16,929	18,933
Florida	18,275	19,497	21,057
Georgia	17,412	18,631	20,494
Kentucky	18,385	19,660	20,100
Louisiana	18,420	18,400	19,690
Mississippi	14,320	15,812	15,971
North Carolina	17,585	18,311	20,691
South Carolina	16,523	17,384	19,800
Tennessee	17,380	17,910	20,080
Virginia	18,535	19,676	21,536
West Vriginia	17,322	17,489	19,563

SOURCE: SEIS data reports

earning opportunities of the college-educated work force in the Southeast. As shown in Table 1, in that year the average teacher salary in the Southeast was slightly less than the lower end of that range. That study also recommended a starting teacher salary level of $18,257 and a scale reflecting merit, experience, and educational development ranging upwards to $29,241.

This report continues the use of the technique developed in that earlier study, but it improves the estimates in two ways. First, this report analyzes more recent data (based on the 1984 Current Population Survey). This means that the estimates are more relevant to the needs of present salary policy discussions. Second, this report is based on a refined methodology of identifying the data base for analysis and for defining the structure of the estimation equations used. Details of the improvements adopted and of the techniques used are presented in the following section.

METHODOLOGY AND STATISTICAL ANALYSIS

The principle used to develop estimates of the alternative earning opportunities of teachers is to examine the earnings of a large sample of nonteaching, college-educated workers in the region and to relate their actual earnings statistically to a set of observable variables that are relevant to the characteristics of the teaching market. The result is an estimate of annual salaries earned in nonteaching occupations by individuals who share the same education and work experience characteristics as teachers.

The critical assumption of compariable earnings analysis is that the probability of a person's choosing to enter the teaching occupation will rise as the average salary of teachers approaches (or surpasses) the average salary available in nonteaching jobs held by similarly educated individuals. The theoretical foundation for the approach used was fully developed in the previously referenced paper (Bird, 1985).

The annual Survey of Income and Employment conducted by the U.S.

Census Bureau provides the data upon which this comparable earnings analysis is based. Results derived from the 1984 survey are reported here. That survey contained records of 1,489 workers in the twelve southeastern states who had completed four or more years of college education. Those records are a subset of the total set of survey records that were constituted to be a representative sample of all households in the Southeast Region.

To compile the set of records for this analysis, only observations for workers who had completed four or more years of college were included. That restriction was adopted to provide a basis of comparison that is equivalent to the minimum education required of teachers. The larger data set was also screened to exclude persons who were under 21 or over 65, to exclude persons who worked fewer than 40 weeks during the previous year, to exclude persons who worked fewer than 30 hours in the average week, to exclude persons who reported annual earnings less than the legal minimum hourly wage rate times annual total hours worked, and to exclude self-employed individuals. The rationale for each of these exclusions is discussed in the following paragraphs.

Persons over 65 and under 21 were screened from the data set because their labor market participation patterns were judged not to be relevant to a comparison for public school teachers. This was a continuation of the procedure used in the previous study.

Persons who worked fewer than 40 weeks per year or less than 30 hours per average week were excluded because their labor force participation was deemed to be essentially part-time and substantially different from the behavior patterns of persons participating in the markets for full-time employment from which potential teachers are more typically drawn. This

restriction of the data set was a departure from the previously used procedure. It was adopted because a clear discontinuity was observed between part-time and full-time earning patterns. In the previous analysis (Bird, 1985), failure to distinguish between the two patterns resulted in a downward bias of the overall earnings alternative estimates.

Persons who reported annual earnings inconsistent with the minimum wage law were excluded because of the possibility that such records represented either misrepresentation, data error, or eccentric labor market behavior that would be irrelevant for comparable earnings estimation purposes. Only 93 observations were excluded for that cause, but their extreme low earnings values would have introduced an unnecessary bias to the analysis. This adjustment was also a departure from the previous procedure.

Persons who reported self-employment as the source of income were excluded from the data set because their earnings included an implicit remuneration for risk-bearing and (in many cases) for self-supplied capital. Those considerations make their earnings not strictly comparable to what one might earn in a salaried employee position as a public school teacher. This restriction of the data was a continuation of the procedure used in the previous analysis.

The data set that remained after applying all of the above restrictions consisted of 1,489 observations of college-educated workers in salaried occupations representing a cross section of all of the various alternatives to employment as a public school teacher.

The basis of comparison provided by this data set is not to any one particular alternative occupation, but to a composite of the variety of alternatives that are available. Since teaching is a field that draws upon

a broad array of skills and talents and draws a very large number of college-educated workers (over ten percent of all college-educated workers in the Southeast are employed as public school teachers), it was deemed appropriate that the basis of comparison be a composite of the various alternatives, rather than any arbitrarily chosen single alternative occupation.

The data set was statistically analyzed using a multiple regression technique. A single equation-reduced form of the market equilibrium condition was used to express annual earnings as a function of several labor force variables. After several functional specifications and data sets were tested, it was found that a logarithmic/linear specification of earnings as a function of education, work experience, sex, race, marital status, number of weeks worked annually, average weekly hours worked, urban or nonurban residence, and college degree holder status provided the best fit to the data. The function expresses the natural logarithm of annual earnings as a linear function of the variables listed above. This equation yielded an R-square measure of fit of .4147. All of the variables chosen were found to have statistically significant T-values of .0026 or better.

The variable for work experience was entered in the function as both its actual value and its squared value. The coefficient of the actual value of experience was found to be positive (.03972), indicating that increased work experience tends to raise expected earnings. The square of experience was found to have a negative value (-.00071), indicating that the effect of experience to increase earnings diminishes as experience accumulates. This finding is consistent with economic theory; the same type of relationship was found in the previous study. For the average worker in the sample, one additional year of experience would, by this

coefficient, add $560 to annual earnings.

The education variable was found to have, as expected, a positive coefficient (.0590). The degree status variable (equal to one if B.A. degree present, zero otherwise) was found to be positive also (.1137). An additional year of education beyond the baccalaureate would imply an additional $1,831 annually for the average worker.

Race was found to be a significant predictor of earnings differences among similarly educated persons. The variable that took a value of one if the respondent was black and zero otherwise was found to have a negative valued coefficient (-.1479), indicating that being black reduces average worker earnings by $6,260.

Sex was also found to be a significant predictor of earnings differences among otherwise similar individuals. The variable taking the value of one for male respondents and zero for female was found to have a positive coefficent (.2779). This implies that for workers having characteristics as described by the data set averages for the other variables, being male adds $8,092 to predicted earnings.

Marital status (one for married, zero otherwise) was found to have a positive coefficient (.1421). Residence (one for urban, zero otherwise) was found to have a positive coefficient (.1257). Number of weeks worked was found to have a positive coefficient (.0492). Average weekly hours worked was found also to have a positive coefficient (.0110). The intercept value of the regression equation was estimated as 5.3926.

For the model, the sum of squared error was 240.3124. The mean standard error was .1626. The F-ratio was 104.73. The R-square value was .4147. Additional variables tested, but discarded as not significant, included number of persons in household, presence of second wage earner,

presence of children, home ownership status, and second job holder status. An alternative specification of the model as strictly linear was found to have lower explanatory power (R-square value of .3570).

The specification used here was consistent with the specification found in the previous study of pay comparison (Bird, 1985), except that in this case the household size variable was found not significant and was eliminated. The previous differentiation among urban, suburban, and rural residence was reduced to a simple urban/rural distinction. The coefficient values estimated from the 1984 data are, of course, different from the values based on the earlier data.

ESTIMATES OF EARNING OPPORTUNITY IN NONTEACHING OCCUPATIONS

Three different bases of comparison were applied to the earning opportunity estimation equation in order to develop a range of earning alternatives. The bases used were the characteristics of the existing teacher work force in the Southeast, the characteristics of the general nonteacher work force of college-educated individuals in the region, and the characteristics of the white male college-educated work force. The average values of the variables used for each of the bases of comparison are shown in Table 2. Each different basis results in different estimates of comparable earnings levels, primarily because of the different sex and race compositions of the groups. As the basis of comparison is shifted toward the white male composition, the estimated earnings potential increases. This is a reflection of the fact that in our society white males, for various reasons, tend to earn more than similarly educated and experienced members of other groups.

TABLE 2

AVERAGE VALUES OF VARIABLES
FOR EACH EARNINGS COMPARISON BASIS

Variable	Teacher	General	White Males
Education Years	17.7	17.4	17.9
Experience Years	16.6	14.9	17.6
Weeks Worked 1984	45.2	51.5	51.8
Average Weekly Hours	42.6	43.3	43.9
Percent Male	22%	66%	100%
Percent Black	24%	10%	0%
Percent Married	74%	69%	71%
Percent Urban	46%	68%	69%
Percent Degreed	100%	86%	92%

NOTE: The coding of Education Years was such that completion of four years of college is recorded as 17 years total.

A range of comparisons is offered because it is not possible to say arbitrarily what basis of comparison is appropriate for developing public school teacher pay strategy. The selection of a basis for application is a matter of policy-maker judgment that depends on how aggressively it is deemed necessary to recruit new teachers from the general labor force. Selection of the existing teacher work force characteristics as the basis of comparison would imply the least aggressive recruiting policy: the policy to adopt if the numbers of persons and levels of ability presently being attracted are deemed sufficient for the future. Selection of the white male basis of earnings comparison would imply the most aggressive policy if the intent of policy is to set teacher pay at a level that would

make the occupation attractive to the largest possible numbers of workers and to the widest range of abilities. If teacher salaries are set at a level that is comparable to the high earning opportunities of white males, then the teaching occupation would be able to attract not only white males, but also be superlatively attractive to females and nonwhites.

Table 3 shows the results of applying the earning opportunity estimation model to the average characteristics of the nonteacher college-educated workers in the Southeast. The results are derived based on 1984 economic conditions and data.

The average nonteacher with a college B.A. degree is estimated to be able to earn $30,472 per year in nonteaching occupations. This estimate is based on .42 years of postgraduate education, 14.9 years of full-time work experience, and 52 weeks worked per year at 40 hours per week. This group is composed of 66 percent males and 10 percent blacks. It accounts for 73 percent of all full-time college-educated workers in the region. The balance consists of teachers and self-employed individuals who were excluded from the data set.

By allowing postgraduate education and experience to vary in sequential substitutions of values into the earnings estimation equation, it is possible to derive a salary schedule as displayed in Table 3. This table indicates that a competitive average salary for full-time work during the first year of employment of a B.A. degree holder would be $19,900. Based on increases for merit related to additional education and experience, the analysis indicates that a competitive salary schedule should range upward to $40,384. That top level would be the average earning opportunity for a 30-year experienced worker with 3 years of postgraduate education.

TABLE 3

EARNING OPPORTUNITY ESTIMATES
IN NONTEACHING OCCUPATIONS
BASED ON GENERAL WORK FORCE CHARACTERISTICS

	Years of Postgraduate Education			
Years of Experience	Zero	One	Two	Three
One	19,900	21,109	22,392	23,753
Three	21,437	22,740	24,122	25,588
Five	22,964	24,360	25,840	27,411
Seven	24,462	25,949	27,526	29,199
Ten	26,614	28,231	29,947	31,767
Fifteen	29,783	31,593	33,513	35,550
Twenty	32,183	34,139	36,213	38,414
Thirty	33,833	35,889	38,070	40,384

The predicted earnings for the average member of the group based on 52 weeks worked at 40 hours per week and B.A. degree holder status and other group average characteristics as listed in Table 2 were found to be $30,472.

The earning opportunity analysis was repeated using the sex, race, residence, experience, education, and marital status values representing the average characteristics of persons currently employed as teachers. For purposes of analysis, the prior procedure of assuming 52 weeks of work at 40 hours per week was applied and B.A. degree holder status was specified. This produced an estimate of the average earning opportunity in nonteaching occupations for a group of persons having the sociodemographic characteristics of the present pool of teachers. The results are reported in Table 4. It was found that the average member of such a group would have a

TABLE 4

EARNING OPPORTUNITY ESTIMATES
IN NONTEACHING OCCUPATIONS
BASED ON CURRENT TEACHER CHARACTERISTICS

	Years of Postgraduate Education			
Years of Experience	Zero	One	Two	Three
One	16,836	17,859	18,945	20,096
Three	18,136	19,239	20,408	21,648
Five	19,428	20,609	21,861	23,190
Seven	20,696	21,953	23,288	24,703
Ten	22,516	23,884	25,336	26,876
Fifteen	25,197	26,728	28,353	30,076
Twenty	27,227	28,882	30,638	32,500
Thirty	28,623	30,363	32,208	34,166

The predicted earnings for the average member of the group based on 52 weeks worked at 40 hours per week and B.A. degree holder status and other group average characteristics as listed in Table 2 were found to be $27,022.

predicted earning opportunity of $27,022 in a nonteaching job. That amount is significantly greater than the regional average teacher salary of $20,204.

The analysis based on teacher characteristics provides a low end set of values for the range of salaries that may be considered to make teaching competitive with nonteaching occupations in the Southeast. The analysis indicates that the average person who now teaches is foregoing an alternative earning opportunity in full-time employment of $16,836 in the first year of experience. The opportunity cost of being a teacher ranges upward

to $34,166 at the top of the experience/education scale according to this analysis. It is the value of that foregone opportunity that the teacher salary scale must compete against to attract and retain teachers similar to today's group.

A third earning opportunity analysis was repeated using the residence, education, and marital status values representing the average characteristics of white male college graduates currently working in nonteaching occupations. As previously, the procedure assumed 52 weeks of work at 40 hours per week and specified B.A. degree holder status. This analysis produced an estimate of the average earning opportunity in nonteaching for white males. Since that group has higher earning opportunities than any other segment of the population, the earning opportunity for white males represents the upper end of the range of slaries that may be considered to make teaching competitive with nonteaching occupations in the Southeast.

It was found that the average member of the white male group had a full-time earning opportunity of $36,767 per year. In order to become a public school teacher, the average white male college graduate worker in the Southeast would have to give up an alternative earning opportunity of $36,767. That is the opportunity cost value against which public schools must compete in order to attract teachers from the white male group on an equal footing with other occupations. The results of the analysis for this group are summarized in Table 5.

The salary scale shown in Table 5 indicates that at the beginning experience level the earning opportunity in nonteaching is $22,279. The earning opportunity estimate rises with education and experience to $45,210 at the highest level. This analysis indicates the upper range of the salary schedule pattern that public schools might need to adopt in order to

compete effectively against nonteaching occupations to recruit

TABLE 5

EARNING OPPORTUNITY ESTIMATES IN NONTEACHING OCCUPATIONS BASED ON WHITE MALE CHARACTERISTICS

	Years of Postgraduate Education			
Years of Experience	Zero	One	Two	Three
One	22,279	23,633	25,069	26,592
Three	23,999	25,458	27,005	28,646
Five	25,709	27,271	28,929	30,687
Seven	27,386	29,050	30,816	32,689
Ten	29,795	31,605	33,526	35,564
Fifteen	33,342	35,369	37,518	39,799
Twenty	36,029	38,219	40,542	43,006
Thirty	37,877	40,179	42,620	45,210

The predicted earnings for the average member of the group based on 52 weeks worked at 40 hours per week and B.A. degree holder status and other group average characteristics as listed in Table 2 were found to be $36,767.

college-educated personnel.

CONCLUSIONS AND RECOMMENDATIONS

This analysis has shown that despite recent gains in teacher pay in the Southeast states, teacher pay levels still fall short of the alternative earning opportunities in other occupations. The 1984 average teacher pay level in the Southeast was reported to be $20,204. That amount is $6,718 less than the estimated alternative earning opportunity of

persons having the sociodemographic characteristics of present teachers. That amount is $10,268 less than the estimated alternative earning opportunity of persons having the sociodemographic characteristics of the general population of college-educated workers in nonteaching jobs. That amount is $16,563 less than the estimated alternative earning opportunity of the white male population of college-educated workers in nonteaching jobs.

The analysis indicates that a range of salaries for full-time work that would make teaching competitive with other occupations in attracting and retaining workers in the Southeast would be $27,022 to $36,767 for average salaries. The competitive beginning salary range for full-time work would be $16,836 to $22,279. The upper end of the salary schedule should offer salary in the range $34,166 to $45,210 in order to be competitive with other occupations.

The analysis was conducted in terms of full-time earning opportunities, 52 weeks of work at 40 hours per week. The typical teaching contract in the Southeast is for only 44 weeks of work, one-sixth less than the full-time basis used here. One might argue that the salary ranges suggested here as competitive with nonteaching alternatives should be reduced by one-sixth to reflect that difference. That adjustment would make the recommended average salary range become $22,522 to $30,647. That range is still above the current average salary level, but indicates a significantly smaller difference.

The problem with the adjustment described above is that it ignores the reality of the process of individual choices among occupations. In order for an individual to choose a ten-month job as a teacher, the individual must forego the opportunity for twelve-month work in another occupation.

Therefore, the choice does involve an opportunity cost of the twelve-month earning alternative. Unless the individual places a high value on leisure time or can earn equivalent rates of pay in part-time summer work, or unless the public schools can offer offsetting amenities in working conditions, the twelve-month opportunity is the salary level that public schools must match in order to compete for employees on an equal footing with other occupations.

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